



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/040,717	01/07/2002	Wolfgang Singer	637.0016USU	1778

7590 09/23/2003

Charles N.J. Ruggiero, Esq.
Ohlandt, Greeley, Ruggiero & Perle, L.L.P.
10th Floor
One Landmark Square
Stamford, CT 06901-2682

EXAMINER

HO, ALLEN C

ART UNIT	PAPER NUMBER
----------	--------------

2882

DATE MAILED: 09/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/040,717

Applicant(s)

SINGER ET AL.

Examiner

Allen C. Ho

Art Unit

2882

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 January 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-8,10-13,17 and 18 is/are rejected.
- 7) ☒ Claim(s) 3,9 and 14-16 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 January 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 0102.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Objections

1. Claim 7 is objected to because of the following informalities:

Claim 7 should depend on claim 4. See claims 2 and 8.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 2, 5, 6, 8, 10, 13, 17, and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Tanaka *et al.* (U. S. Patent No. 6,057,899).

The recitation "an illumination system for lithography with wavelengths of ≤ 193 nm" has not been given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

With regard to claim 1, Tanaka *et al.* disclosed an illumination system for lithography with wavelengths of ≤ 193 nm comprising: a first optical element (103), which is divided into first raster elements (109) and lies in a first plane, wherein the first plane defines an x-direction and a y-direction, wherein the first raster elements each have an x-direction and a y-direction with an aspect ratio, and wherein at least two of the raster elements (109A, 109) have aspect ratios of different magnitude.

With regard to claim 2, Tanaka *et al.* disclosed the illumination system according to claim 1, further comprising a second optical element (104), which is divided into second raster elements (210), wherein a second raster element is assigned to a first raster element (column 9, lines 51-54), and wherein at least one second raster element has an anamorphic effect (column 10, lines 8-12).

With regard to claims 5 and 6, Tanaka *et al.* disclosed the illumination system according to claim 1, wherein the first raster elements have an isotropic optical effect (only 210A and 210B are anamorphic).

With regard to claim 8, Tanaka *et al.* disclosed the illumination system according to claim 2, wherein the second raster elements that have an anamorphic optical effect are of a shape selected from the group consisting of cylinders and toroids (column 10, lines 8-12).

With regard to claim 10, Tanaka *et al.* disclosed the illumination system according to claim 1, further comprising a collector unit (102), which illuminates the first plane with the first raster elements.

With regard to claim 13, Tanaka *et al.* disclosed the illumination system according to claim 1, wherein the first raster elements are rectangular.

Art Unit: 2882

With regard to claim 17, Tanaka *et al.* disclosed an illumination system, comprising: an optical element (103) having a first raster element (109A) and a second raster element (109), wherein the first raster element has a first aspect ratio, wherein the second raster element has a second aspect ratio, and wherein the first aspect ratio is not equal to the second aspect ratio.

With respect to claim 18, Tanaka *et al.* disclosed an illumination system for radiation wavelengths of ≤ 193 nm, comprising an optical element (103) having a first raster element (109A) and a second raster element (109) of different sizes.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 4 and 7 rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka *et al.* (U. S. Patent No. 6,057,899) as applied to claim 1 above, and further in view of Kurtz (U. S. Patent No. 5,754,278) and Grafton (U. S. Patent No. 6,181,482 B1).

With regard to claims 4 and 7, Tanaka *et al.* disclosed the illumination system according to claim 1.

However, Tanaka *et al.* failed to teach that at least one of the at least two first raster elements with aspect ratios of different magnitude has an anamorphic optical effect, and are of shape selected from the group consisting of cylinders and toroids.

Kurtz disclosed an array of cylindrical raster elements that have an anamorphic optical effect (column 11, lines 2-13).

Grafton taught that the aspect ratio could be changed by using anamorphic effect (column 3, lines 34-37).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide at least one of the two cylindrical first raster elements with different aspect ratios with anamorphic effect, since a person would be motivated to modify or correct the aspect ratio according to engineering requirement.

6. Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka *et al.* (U. S. Patent No. 6,057,899) as applied to claims 1 and 2 above, and further in view of Fukuda *et al.* (U. S. Patent No. 6,219,111 B1).

With regard to claims 11 and 12, Tanaka *et al.* disclosed the illumination system according to claim 1.

However, Tanaka *et al.* failed to teach that the illumination system further comprises at least one field mirror.

Fukuda *et al.* disclosed an illumination system comprising field mirrors (16) for directing light beams.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide field mirrors in the illumination system, since a person would be motivated to use field mirrors to direct light beams as dictated by engineering requirement.

Allowable Subject Matter

7. Claims 3, 9, and 14-16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. The following is a statement of reasons for the indication of allowable subject matter:

With regard to claim 3, although the prior art discloses the illumination system according to claim 2, it fails to teach or fairly suggest that at least some of the second raster elements have anamorphic optical effect, which is selected such that an aspect ratio of images of the first raster elements is substantially the same in the object plane, independent of the aspect ratio of the first raster elements, as claimed in claim 3.

With regard to claim 9, although the prior art discloses the illumination system according to claim 1, it fails to teach or fairly suggest that all of the first raster elements are completely illuminated in the first plane, as claimed by claim 9.

With regard to claim 14, although the prior art discloses the illumination system according to claim 1, it fails to teach or fairly suggest that the illumination system defines a segment of a ring field, as claimed in claim 14.

With regard to claims 15 and 16, although the prior art discloses the illumination system according to claim 1, it fails to teach or fairly suggest a projection exposure system comprising the illumination system, a pattern-bearing mask, and a light-sensitive substrate, as claimed in claim 15.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

- (1) Ota (U. S. Patent No. 6,594,334 B1) disclosed an illumination system comprising an array of raster elements.
- (2) Schultz (U. S. Patent No. 6,507,440 B1) disclosed an illumination system comprising components with anamorphic effect for reducing an aspect ratio of a raster element.
- (3) Schultz *et al.* (U. S. Patent No. 6,438,199 B1) disclosed an illumination system comprising two arrays of raster elements.
- (4) Schultz *et al.* (U. S. Patent No. 6,400,794 B1) disclosed an illumination system for EUV lithography comprising two arrays of raster elements.
- (5) Schultz *et al.* (U. S. Patent No. 6,198,793 B1) disclosed an illumination system for EUV lithography.
- (6) Oshino (U. S. Patent No. 5,677,939) disclosed an illumination apparatus comprising an array of raster elements.
- (7) Murakami *et al.* (U. S. Patent No. 5,581,605) disclosed an optical element comprising a two-dimensional array of elements.
- (8) Mashima *et al.* (U. S. Patent No. 5,669,708) disclosed an illumination system comprising an array of raster elements.
- (9) Torigoe (U. S. Patent No. 4,682,885) disclosed an illumination system for lithography.

Art Unit: 2882

- (10) Eugene Hecht and Alfred Zajac. Optics (Reading, MA: Addison-Wesley, 1979), p. 144-145. An introduction to anamorphic effect.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allen C. Ho whose telephone number is (703) 308-6189. The examiner can normally be reached on Monday - Friday from 8:00 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward J. Glick can be reached at (703) 308-4858. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0530.



Allen C. Ho
Patent Examiner
Art Unit 2882

ACH